



UNITED STATES PATENT AND TRADEMARK OFFICE

AZ

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,064	10/13/2000	David B. Miller	10001197-1	1275
22878	7590	11/06/2003	EXAMINER	
AGILENT TECHNOLOGIES, INC. INTELLECTUAL PROPERTY ADMINISTRATION, LEGAL DEPT. P.O. BOX 7599 M/S DL429 LOVELAND, CO 80537-0599			TRAN, MINH LOAN	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

09/688,064

Applicant(s)

MILLER ET AL.

Examiner

Minhloan T. Tran

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-13 and 21-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3 and 28 is/are allowed.
- 6) ☒ Claim(s) 4,5,7-9,11-13,21,23,26,29-31 is/are rejected.
- 7) ☒ Claim(s) 6,10,22,24,25,27,32 and 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 21, lines 1 and 2, "the one or more optical lenses are incorporated into the device bonding surface" is inconsistent with the independent claim 4 which recites the one or more **optical lenses are incorporated into an optical substrate that is bonded to a spacer substrate having a device bonding surface**.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 13 stand rejected under 35 U.S.C. 102(e) as being anticipated by Jewell et al. (6,243,508).

Jewell et al. discloses an optoelectronic device comprising an optical lens system comprising a lens substrate 12 supporting one or more optical lenses 24 and a semiconductor (silicon) circuit layer 132 functions as a spacer substrate defining one or more apertures 133 therethrough; an optical device systems comprising a device substrate supporting one or more optical devices 26'; wherein the lens substrate 12 is bonded to the silicon circuit layer 132 which functions as a spacer substrate, and the silicon spacer substrate 132 is bonded to the device substrate supporting one or more optical devices 26', wherein with the optical lens 24, the optical aperture 133 and the optical device 26' held together in registered alignment. Note figure 17 of Jewell et al.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4,5,7-9,11,12,23,26,29,30,31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell et al. (6,243,508).

With regard to claims 4, 11, 29, figure 17 of Jewell et al. discloses an optoelectronic device comprising an optical device system comprising an optical device substrate supporting one or more optical devices 26'; an optical lens system comprising one or more optical lens 24 incorporated into an optical substrate 12 bonded to a silicon circuit layer 132 functions as a spacer substrate, the silicon circuit layer 132 functions

Art Unit: 2826

as a spacer substrate having a device bonding surface and having an integrated circuit for driving the optical device 26' (see lines 3-19 in column 15 of Jewell et al.), a plurality of solder bumps 148 disposed between the optical device substrate supporting one or more optical devices 26' and the optical lens system having one or more optical lens 24; wherein the plurality of solder bumps 148 bond the optical device substrate supporting one or more optical devices 26' to the device bonding surface of the circuit layer 132 which functions as the spacer substrate, with the one or more optical devices 26' aligned with the one or more optical lens 24; and wherein a characteristic dimension of the plurality of solder bumps 148 is selected based upon a representative focal distance between the one or more optical devices 26' and the one or more optical lens 24 (lines 5-10 in column 16 and lines 43-46 in column 11 of Jewell et al.) Note figures 16, 17, 19 and columns 14-16 of Jewell et al.

Jewell et al. does not disclose the metallization patterns of the optical device system and the optical lens system. However, it would have been obvious to one of ordinary skill in the art to form the optoelectronic device of Jewell et al. comprising the optical device system and the optical lens system having the metallization patterns (i.e. bonding pads), because such structure is conventional in the art for bonding the solder bump 148 to the optical device system or to the optical lens system.

With regard to claims 5, 31, figure 17 of Jewell et al. shows the circuit layer 132 functions as a spacer substrate bonded to the optical substrate 12. Lines 13-15 in column 15 of Jewell et al. disclose that the optical substrate 12 is sapphire and the circuit layer 132 is a silicon-on-sapphire (SOS) structure i.e. the silicon layer 132

bonded to the sapphire substrate 12. Jewell et al. does not disclose the bonding between the optical substrate 12 and the circuit layer 132 functions as a spacer substrate is a wafer bond. However, Applicant's claims 5 does not distinguish over the Jewell et al. reference regardless of the process used to bond the substrates together, because only the final product is relevant, not the process of making such as wafer bonding process.

Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

With regard to claim 7, figure 17 of Jewell et al. does show the circuit layer 132 functions as a spacer substrate having a predetermined thickness. Jewell et al. does not disclose the thickness of the spacer substrate is selected based upon a representative focal distance between the optical devices and the optical lenses. However, it would have been obvious to one of ordinary skill in the art to form the thickness of the spacer substrate is selected based upon a representative focal distance between the optical

Art Unit: 2826

devices and the optical lenses in order to maximize the efficiency of receiving optoelectronic devices 26'. Note lines 1, 2 in column 15 and lines 43-46 in column 11 are cited to support for the well-known position.

With regard to claim 8, figure 17 of Jewell et al. does show the circuit layer 132 which functions as the spacer substrate comprises an aperture 133 through which light is transmitted between the optical device 26' and the optical lens 24. Note lines 1 and 2 in column 15 of Jewell et al.

With regard to claim 9, figure 17 and lines 13-20 in column 15 of Jewell et al. disclose an integrated circuit formed in the circuit layer 132 which functions as a spacer substrate and configured to drive the optical device 26.

With regard to claim 12, figures 16, 17 of Jewell et al. show the optical device 26' is a photodetector.

With regard to claims 23, 26, figures 16 and 17 of Jewell et al. show multiples optical lenses 24 are cooperatively arranged in optical alignment with multiple respective optical devices 26, 26'.

With regard to claim 30, figure 17 of Jewell et al. does not disclose the device substrate is a semiconductor substrate. However, it would have been obvious to one of ordinary skill in the art to form the device substrate is a semiconductor substrate because such structure is conventional in the art for integrating a plurality of semiconductor elements in the same substrate.

Response to Arguments

4. Applicant's arguments filed 07/07/2003 have been fully considered but they are not persuasive.

It is argued, at pages 3 and 4 of the remarks, that "A "substrate" is well-known term of art of that refers to the **foundation or supporting base material on which a device or other structure is fabricated or assembled**" and "one of ordinary skill in the art at the time of the invention would not reasonably have concluded that Jewell et al. 's circuit layer 132 was a substrate." However, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., **foundation or supporting base material on which a device or other structure is fabricated or assembled**) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, Applicant's specification does not define the spacer substrate 80 is a **foundation or supporting base material on which a device or other structure is fabricated or assembled**.

It is argued, at page 3 of the remarks, that "the circuit layer 132 shown in Fig. 17 of Jewell does not constitute a spacer substrate." However, figure 17 of Jewell et al. does show a circuit layer 132 functions as a spacer substrate because it separates the lens substrate 12 from the device substrate that supports one or more optical devices 26'. Note that a recitation of the intended use of the claimed invention (i.e., spacer substrate) must result in a structural difference between the claimed invention and the

prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Note that on page 8, lines 14-29, of the applicant's specification, the spacer substrate 80 is used for separating the optical device 44 from the optical element 52. Applicant's specification does not define the spacer substrate 80 is a **foundation or supporting base material on which a device or other structure is fabricated or assembled**. Figure 17 of Jewell et al. does show a circuit layer 132 functions as a spacer substrate because the circuit layer 132 separates the optical device 26' from the optical element 24 by a distance. Thus, applicant's claim 13 does not distinguish over the Jewell et al. reference.

It is argued, at page 4 of the remarks, that "the term "bonded", when used in the context of one substrate bonded to another substrate, has an ordinary and accustomed meaning in the art that refers to a **bonding state in which an intermediate bonding region exists between two substrates**" and "one of ordinary skill in the art at the time of the invention would not reasonably have concluded that Jewell et al. 's circuit layer 132 was "bonded" to wafer 12." However, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a bonding state in which **an intermediate bonding region exists between two substrates**) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from

the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Thus, applicant's claim 13 does not distinguish over the Jewell et al. reference.

It is argued, at page 5 of the remarks, that "Independent claim 4 has been amended and now requires Jewell 's connector does not contain a spacer substrate, much less a spacer substrate bonded to a lens substrate." However, Applicant's claim 4 does not distinguish over the Jewell et al. reference as the reason set forth above for claim 13.

It is argued, at page 6 of the remarks, that "claim 5, however, now call for specific bonds (namely, a wafer bond) that are readily distinguishable from the epitaxial bonds between Jewell's polycrystalline (or crystalline) silicon circuit layer 132 and wafer 12." However, lines 13-15 in column 15 of Jewell et al. disclose that the optical substrate 12 is sapphire and the circuit layer 132 is a silicon-on-sapphire (SOS) structure i.e. the silicon layer 132 is bonded to the sapphire substrate 12. Jewell et al. does not disclose the bonding between the optical substrate 12 and the circuit layer 132 functions as a spacer substrate is a wafer bond. Applicant's claim 5 does not distinguish over the Jewell et al. reference regardless of the process used to bond the substrates together, because only the final product is relevant, not the process of making such as wafer bonding process.

It is argued, at page 6 of the remarks, that "Claim 7 recites that ... Jewell does not teach or suggest anything about the thickness of circuit layer 132." However, figure 17 of Jewell et al. does show the circuit layer 132 functions as a spacer substrate

Art Unit: 2826

having a predetermined thickness and the distance from the optical device 26' to the optical lens 24 is approximated and varied in the simulation to achieve best system performance (note lines 43-46 in column 11 of Jewell et al.) Jewell et al. does not disclose the thickness of the spacer substrate is selected based upon a representative focal distance between the optical devices and the optical lenses. It would have been obvious to one of ordinary skill in the art to form the thickness of the spacer substrate is selected based upon a representative focal distance between the optical devices and the optical lenses in order to maximize the efficiency of receiving optoelectronic devices 26'. Note lines 1 and 2 in column 15 are cited to support for the well-known position.

It is argued, at page 7 of the remarks, that "Independent claim 11 requires ... a characteristic dimension of the plurality of solder bumps is selected based upon a representative focal distance between the one or more optical devices and the one or more optical lenses.... Jewell fails to teach or suggest anything about the dimension of bump bonds 148." However, figures 17, 19 and lines 5-10 in column 16 and lines 43-46 in column 11 of Jewell et al. do disclose that the distance from the optical device 26' to the optical lens 24 is approximated and varied in the simulation to achieve best system performance. Therefore, it would have been obvious to one of ordinary skill in the art to form a plurality of solder bumps of Jewell et al. having a dimension that is selected based upon a representative focal distance between the optical devices and the optical lenses in order to maximize the efficiency of receiving optoelectronic devices 26'. Since applicant's claim 11 does not recite a **specific** focal distance between the one or more

Art Unit: 2826

optical devices and the one or more optical lenses, Applicant's claim 11 does not distinguish over the Jewell et al. reference.

Allowable Subject Matter

5. Claims 3, 28 are allowable over the references of record because none of these references disclose or can be combined to yield the claimed invention such as the one or more optical lenses are recessed below the device bonding surface of the optical lens system.

6. Claims 6, 10, 22, 24, 25, 27, 32, 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claim 21 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

Art Unit: 2826


shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minhloan T. Tran whose telephone number is (703) 308-4919. The examiner can normally be reached on Monday-Friday 9:00 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Mlt
11/2003


Minhloan T. Tran
Primary Examiner
Art Unit 2826